

# SEQUENCE LISTING

<110> Kovacs, et al.

<120> Identification of a region of the major surface  
glycoprotein (MSG) gene of human *Pneumocystis carinii*

<130> 4239-66050

<150> 09/762,724

<151> 2001-09-02

<150> PCT/US99/18750

<151> 1999-08-17

<150> US 60/096,805

<151> 1998-08-17

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<170> PatentIn Ver. 2.0

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Asn Leu Val Tyr Ala Ala Pro Gly Ser His Phe Asp Pro Thr Lys Leu	
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Lys Ile Arg Leu Ala Glu Glu Ile Asp Leu Glu Lys Leu Tyr Val Glu	
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Ala Val Lys Lys Gly Ile His Ile Gly Arg Pro Ser Ile Lys Asp Glu	
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Val Ala Leu Leu Ala Leu Leu Ser Lys Ser Asp Ala Gln Asn Thr Phe	
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Phe Val Leu Cys Met Asn Pro Ile Lys Thr Ala Leu Thr Val Ser Thr	
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Leu Tyr Leu Glu Leu Lys Glu Ile Cys Asn His Ser Leu Lys Asn Cys	
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Gly Phe Lys Lys Glu Cys Asp Cys Glu Asp Pro Cys Lys Lys Ile Gln	
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Thr Trp Val Thr Lys Thr Thr Thr His Thr Ser Thr Ser Thr Thr Thr	
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Ser Thr Val Thr Ser Arg Ile Thr Leu Thr Ser Thr Arg Arg Cys Lys	
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Pro Thr Lys Cys Thr Thr Gly Glu Glu Asp Glu Ala Gly Asp Val Lys	
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Pro Ser Glu Gly Leu Arg Met Ser Gly Trp Ser Val Met Arg Gly Val	
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Glu	Gly	Ile	Asp	Leu	Val	Leu	Gly	Lys	Glu	Asp	Leu	Leu	Lys	Glu	Lys	210	215		220
Cys	Leu	Leu	Phe	Leu	Glu	Glu	Cys	Tyr	Phe	Tyr	Gly	Ser	Asn	Cys	Glu	225	230		235
Thr	Asp	Gln	Pro	Lys	Cys	Lys	Glu	Phe	Ala	Ser	Lys	Cys	Gln	Lys	Glu	245	250		255
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Ala	Val	Lys	Lys	Gly	Ile	His	Ile	Gly	Arg	Pro	Ser	Ile	Lys	Asp	Glu	290	295		300
Val	Ala	Leu	Leu	Ala	Leu	Leu	Ser	Lys	Ser	Asp	Ala	Gln	Asn	Thr	Phe	305	310		315
Lys	Asp	Gln	Cys	Glu	Asp	Val	Ile	Lys	Lys	Lys	Cys	Gly	Asn	Phe	Lys	325	330		335
Glu	His	Ile	Ile	Leu	Lys	Asp	Leu	Cys	Ser	Asn	Lys	Thr	Ile	Thr	Asp	340	345		350
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Ala	Pro	Leu	Glu	Lys	Pro	Cys	Asn	Asn	Leu	Lys	Ala	Ala	Cys	Tyr	Lys	420	425		430
Lys	Gly	Leu	Glu	Ala	Val	Ala	Asn	Glu	Ala	Leu	Gln	Asp	Lys	Leu	Arg	435	440		445
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Asn	Leu	Val	Lys	Val	Cys	Glu	Lys	Thr	Lys	Gly	Glu	Ser	Asp	Glu	Leu	465	470	475	480
Phe	Val	Leu	Cys	Met	Asn	Pro	Ile	Lys	Thr	Ala	Leu	Thr	Val	Ser	Thr	485	490		495
Asp	Leu	Arg	Met	Arg	Ala	Val	Ala	Leu	Gln	Glu	His	Leu	Asn	Glu	Lys	500	505		510
Arg	Asp	Phe	Pro	Thr	Glu	Lys	Asp	Cys	Lys	Glu	Leu	Glu	Lys	Lys	Cys	515	520		525
Glu	Val	Leu	Gly	Lys	Asp	Ser	Arg	Glu	Ile	Lys	Trp	Ser	Cys	Tyr	Thr	530	535		540
Leu	Lys	Gln	His	Cys	Asn	Arg	Leu	Lys	Ser	Ile	Glu	His	Leu	Glu	Glu	545	550		555
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Lys	Glu	Glu	Ala	Lys	Lys	Arg	Cys	Glu	Lys	Trp	Phe	Arg	Arg	Glu	Asn	580	585		590
Asn	Lys	Phe	Phe	Ser	Ala	Cys	Ser	Asp	Leu	Glu	Leu	Val	Cys	Lys	Lys	595	600		605
Ile	Thr	Arg	Asn	Val	Glu	Ser	Lys	Cys	Asn	Ile	Leu	Lys	Gly	His	Met	610	615		620
Glu	Thr	Met	Asn	Val	Ile	Ser	Glu	Ile	Ala	Lys	Lys	Glu	Glu	Lys	Ile	625	630		635
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Lys	Leu	Lys	Asn	Gly	Gly	Lys	Asp	Gly	Gln	Cys	Lys	Lys	Leu	Asn	Lys	660	665		670
Lys	Cys	Lys	Ser	Phe	Leu	Glu	Lys	Glu	Ala	Leu	Glu	Asn	Lys	Val	Val	675	680		685
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Thr	Leu	Cys	Lys	Ser	Lys	Glu	Asn	Thr	Lys	Ser	Asp	Ile	Lys	Val	Arg	725	730		735
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Lys	Leu	Lys	Asp	Glu	Leu	Glu	Glu	Val	Lys	Glu	Val	Leu	Glu	Lys	Lys	755	760		765
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Gly Ser Asn Lys Asp Trp Leu Lys Lys Phe Gln Gln Glu Leu Ala Lys	
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Val Cys Glu Lys Leu Lys Gly Asn Lys Gly Ser Phe Ser Asn Asp Glu	
485 490 495	
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Leu Phe Val Leu Cys Ile Gln Pro Ala Lys Ala Ala Arg Leu Leu Thr	
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His	His	His	Gln	Met	Arg	Val	Ile	Phe	Leu	Arg	Gln	Gln	Leu	Asp	Gln	
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Lys	Arg	Asp	Phe	Pro	Thr	Asp	Lys	Asp	Cys	Lys	Glu	Leu	Gly	Arg	Lys	
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Cys	Gln	Asp	Leu	Gly	Lys	Asp	Ser	Lys	Glu	Ile	Thr	Trp	Pro	Cys	His	
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Thr	Leu	Glu	Gln	Gln	Cys	Asn	Arg	Leu	Gly	Ile	Thr	Glu	Ile	Leu	Lys	
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cag	att	tta	ttg	gat	gaa	cac	aaa	gat	act	ttg	aaa	agt	cat	gaa	aac	1776
Gln	Ile	Leu	Leu	Asp	Glu	His	Lys	Asp	Thr	Leu	Lys	Ser	His	Glu	Asn	
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Arg	Phe	Leu	Pro	Asn	Cys	Pro	Asp	Leu	Lys	Lys	Gly	Lys	Thr	Phe	Cys	
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Gln	Asn	Leu	Lys	Lys	Tyr	Cys	Glu	Pro	Phe	Tyr	Lys	Arg	Lys	Val	Leu	
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Lys	Cys	Glu	Pro	Ala	Leu	Glu	Arg	Tyr	Cys	Thr	Val	Leu	Lys	Asp	Val	
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Asn	Asn	Ala	Ser	Ile	Ser	Ser	Leu	Cys	Lys	Asp	Asn	Thr	Glu	Ser	Lys	
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Leu	Val	Glu	Glu	Val	Glu	Gln	Gln	Cys	Lys	Val	Leu	Pro	Thr	Glu	Leu	
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Leu	Lys	Glu	Arg	Ala	Lys	Lys	Ala	Met	Asn	Lys	Ser	Ser	Leu	Val	Leu	
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Asn	Lys	Asp	Lys	Asn	Val	Val	Ser	Asn	Gly	Leu	Gln	Asp	Thr	Thr	Lys	
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Tyr	Val	Lys	Ile	Leu	Arg	Arg	Gly	Val	Lys	Glu	Ala	Leu	Val	Thr	Glu	
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Ser	Glu	Ala	Lys	Ala	Phe	Asp	Leu	Ala	Ala	Glu	Val	Phe	Gly	Arg	Tyr	
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Lys	Asp	Asp	Cys	Asp	Gly	Leu	Lys	Glu	Val	Cys	Gly	Lys	Ile	Glu	Lys	
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Thr	Cys	His	Asp	Leu	Lys	Pro	Leu	Glu	Val	Lys	Ser	His	Glu	Ile	Val	
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Thr	Glu	Ser	Thr	Thr	Thr	Thr	Thr	Thr	Thr	Thr	Thr	Thr	Val	Thr	Asp	
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Pro	Lys	Ala	Thr	Glu	Cys	Lys	Ser	Leu	Gln	Thr	Thr	Asp	Thr	Trp	Val	
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Thr	Gln	Thr	Ser	Thr	His	Thr	Ser	Thr	Ser	Thr	Ile	Thr	Ser	Thr	Ile	
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Thr	Ser	Lys	Ile	Thr	Leu	Thr	Ser	Thr	Arg	Arg	Cys	Lys	Pro	Thr	Lys	
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 Cys Thr Thr Gly Asp Glu Ala Gly Asp Val Lys Pro Ser Glu Gly Leu  
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 Asp Thr Lys Cys Lys Thr Lys Leu Glu Glu Tyr Cys Lys Thr Leu Thr  
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 Val Asn Gln Lys Cys Ile Lys Phe Gln Gly Lys Leu Gln Thr Ala Ala  
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 Gly Lys Lys Ile Ser Glu Leu Thr Asp Glu Asp Cys Lys Lys Asn Glu  
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 Gln Gln Cys Leu Phe Leu Glu Gly Ala Cys Pro Thr Glu Leu Lys Asp  
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 Asp Cys Asn Lys Leu Arg Asn Asn Cys Tyr Gln Lys Glu Arg Asn Asn  
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 Val Ala Glu Glu Val Leu Leu Arg Ala Leu Arg Gly Asp Leu Asn Glu  
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 Thr Lys Thr Cys Glu Lys Lys Leu Lys Glu Val Cys Pro Lys Leu Glu  
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 Arg Glu Ser Asp Glu Leu Thr Glu Leu Cys Leu Tyr Gln Lys Thr Thr  
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 Cys Val Ser Leu Val Thr Lys Gly Lys Ser Lys Cys Asp Thr Leu Glu  
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 Lys Glu Val Glu Glu Ala Leu Lys Lys Asn Glu Leu Arg Glu Lys Cys  
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Val	Pro	Glu	Cys	Asp	Glu	Leu	Ala	Glu	Lys	Cys	Gly	Lys	Glu	Asn	Ile	260	265	270	
Val	Tyr	Met	His	Pro	Gly	Ser	Asp	Phe	Asp	Pro	Thr	Lys	Pro	Glu	Pro	275	280	285	
Thr	Leu	Ala	Glu	Asp	Ile	Gly	Leu	Glu	Glu	Leu	Tyr	Lys	Arg	Ala	Glu	290	295	300	
Glu	Asp	Gly	Ile	Phe	Val	Gly	Arg	Gln	His	Val	Arg	Asp	Ala	Thr	Ala	305	310	315	320
Leu	Leu	Ala	Leu	Leu	Leu	Lys	Lys	Thr	Leu	Lys	Lys	Glu	Glu	Cys	Ile	325	330	335	
Lys	Ala	Leu	Lys	Lys	Asn	Cys	Glu	Asn	Pro	His	Glu	His	Glu	Ala	Leu	340	345	350	
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Cys	Asp	Glu	Leu	Glu	Lys	Asp	Val	Asn	Lys	Thr	Cys	Thr	Ser	Leu	Thr	370	375	380	
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Glu	Trp	Gly	Lys	Leu	Pro	Thr	Phe	Leu	Ser	Asp	Glu	Asp	Cys	Ala	Lys	405	410	415	
Leu	Glu	Ser	Tyr	Cys	Phe	Tyr	Tyr	Lys	Glu	Thr	Cys	Pro	Asp	Val	Lys	420	425	430	
Glu	Ala	Cys	Met	Asn	Val	Arg	Ala	Ala	Cys	Tyr	Lys	Arg	Gly	Leu	Asp	435	440	445	
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Gly	Ser	Asn	Lys	Asp	Trp	Leu	Lys	Lys	Phe	Gln	Gln	Glu	Leu	Ala	Lys	465	470	475	480
Val	Cys	Glu	Lys	Leu	Lys	Gly	Asn	Lys	Gly	Ser	Phe	Ser	Asn	Asp	Glu	485	490	495	
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His	His	His	Gln	Met	Arg	Val	Ile	Phe	Leu	Arg	Gln	Gln	Leu	Asp	Gln	515	520	525	
Lys	Arg	Asp	Phe	Pro	Thr	Asp	Lys	Asp	Cys	Lys	Glu	Leu	Gly	Arg	Lys	530	535	540	

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 Asp Thr Lys Cys Lys Thr Lys Leu Glu Glu Tyr Cys Lys Thr Leu Thr  
 35 40 45  
 aat gca gga tta aat cca gaa aaa gtt cac gaa aaa tta aaa gat ttc 192  
 Asn Ala Gly Leu Asn Pro Glu Lys Val His Glu Lys Leu Lys Asp Phe  
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Val Ala Glu Glu Val Leu Leu Arg Ala Leu Arg Gly Asp Leu Asn Glu	
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Val Tyr Met His Pro Gly Ser Asp Phe Asp Pro Thr Lys Pro Glu Pro	
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Thr Leu Ala Glu Asp Ile Gly Leu Glu Glu Leu Tyr Lys Arg Ala Glu	
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Leu Leu Ala Leu Leu Leu Lys Lys Thr Leu Lys Lys Glu Glu Cys Ile	
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Lys Ala Leu Lys Lys Asn Cys Glu Asn Pro His Glu His Glu Ala Leu	
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Lys Arg Asp Phe Pro Thr Asp Lys Asp Cys Lys Glu Leu Gly Lys Lys	
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Gln	Val	Leu	Leu	Asp	Glu	His	Lys	Asp	Thr	Leu	Lys	Asp	Gln	Glu	Ser	
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Cys	Glu	Pro	Ala	Leu	Asn	Arg	Tyr	Cys	Thr	Val	Ala	Gly	Asn	Val	Asn	
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Lys Ile Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr	
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3084

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Gly	Ser	Asn	Gln	Ser	Trp	Leu	Lys	Glu	Phe	Gln	Gln	Arg	Leu	Val	Lys	465	470	475
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Cys	Gln	Asp	Leu	Gly	Lys	Asp	Ser	Lys	Glu	Ile	Thr	Trp	Pro	Cys	His	545	550	555
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Gln	Val	Leu	Leu	Asp	Glu	His	Lys	Asp	Thr	Leu	Lys	Asp	Gln	Glu	Ser	580	585	590

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 Thr Gly Asp Asp Ala Glu Asp Val Lys Pro Ser Glu Gly Leu Arg Val  
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Ile Ile Tyr Thr His Pro Gly Ser Asp Phe Asn Pro Thr Lys Ser Lys	
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Lys Tyr Leu Lys Arg Lys Cys His Lys Trp Ser Arg Arg Gly Asp Asp	
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Val Asp Asp Val Lys Asp Arg Cys Glu Val Phe Glu Lys Asn Met Gln	
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Ser Ser Ile Asn Ser Leu Cys Lys Asp Asn Thr Glu Ser Lys Thr Lys	
740 745 750	
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Lys Thr Asp Asn Glu Val Arg Lys Lys Leu Cys Leu Lys Leu Val Glu	
755 760 765	
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Glu Lys Asp Leu Lys Asp Asp Phe Glu Thr Phe Glu Lys Leu Lys Lys	
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Gln Ala Glu Lys Thr Met Asn Lys Ser Asn Leu Val Leu Ser Phe Val	
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Lys	Asn	Thr	Val	Ser	Asn	Gly	Leu	Gln	Asp	Thr	Thr	Glu	His	Met	Lys	
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Ile	Leu	Arg	Arg	Gly	Val	Lys	Asp	Val	Ser	Val	Thr	Glu	Ser	Glu	Ala	
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Lys	Ala	Phe	Asp	Leu	Val	Ala	Glu	Val	Phe	Gly	Arg	Tyr	Leu	Asp	Leu	
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Cys	Lys	Asp	Leu	Glu	Gly	Val	Cys	Gly	Lys	Ile	Gln	Gly	Val	Cys	Ser	
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Thr	Thr	Thr	Thr	Thr	Thr	Thr	Thr	Thr	Thr	Val	Thr	Asp	Pro	Lys	Ala	
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Thr	Glu	Cys	Lys	Ser	Leu	Gln	Thr	Thr	Asp	Thr	Trp	Ile	Thr	Gln	Thr	
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Ser	Thr	His	Thr	Ser	Thr	Ser	Thr	Ile	Thr	Ser	Thr	Ile	Thr	Ser	Lys	
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Gly																
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Glu Lys Leu Thr Gln Lys Cys Thr Ala Ile Lys Gly Lys Leu Thr Glu  
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Ala Ile Lys Lys Lys Asn Ser Asp Leu Thr Asp Glu Asp Cys Lys Glu  
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Lys Asp Asp Cys Asn Thr Leu Arg Asn Lys Cys Tyr Gln Lys Lys Arg  
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Asp Lys Val Ala Glu Glu Ala Leu Leu Arg Ala Val Arg Gly Gly Leu  
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Ile Asn Glu Thr Thr Cys Glu Gly Lys Leu Lys Glu Val Cys Ile Glu  
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Met Thr Cys Lys Thr Phe Val Leu Glu Lys Gln Lys Lys Cys Asn Ala  
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Gly Lys Cys Leu Pro Leu Leu Glu Arg Cys Tyr Phe Tyr Arg Gly Asn  
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Tyr Leu Pro Val Cys Asp Thr Leu Ala Val Lys Cys Glu Glu Asn Lys  
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 Cys Lys Asp Leu Glu Gly Val Cys Gly Lys Ile Gln Gly Val Cys Ser  
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Asp	Glu	Val	Asn	Ile	Leu	Ala	Leu	Ile	Leu	Gln	Glu	Asp	Ala	Met	Glu	
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Asp	Thr	Lys	Cys	Lys	Lys	Ser	Leu	Glu	Lys	Tyr	Cys	Glu	Glu	Leu	Lys	
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Lys	Ala	Ser	Leu	Asp	Met	Glu	Lys	Val	His	Lys	Met	Leu	Lys	Asp	Phe	
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Cys	Gly	Asn	Gly	Lys	Ala	Ser	Lys	Ala	Asn	Thr	Lys	Cys	Gln	Gly	Leu	
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Gln	Ala	Lys	Val	Thr	Gly	Lys	Cys	Thr	Asn	Phe	Lys	Thr	Gln	Lys	Leu	
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gga	cca	gcg	tta	aca	aat	cca	tca	gat	gat	aat	tgc	aaa	gag	agt	gaa	336
Gly	Pro	Ala	Leu	Thr	Asn	Pro	Ser	Asp	Asp	Asn	Cys	Lys	Glu	Ser	Glu	
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Arg	Gln	Cys	Leu	Phe	Leu	Glu	Gly	Ala	Cys	His	Asn	Leu	Val	Glu	Asp	
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Cys	Asn	Lys	Leu	Arg	Asn	Leu	Cys	Tyr	Gln	Lys	Arg	Asp	Gly	Val		
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Glu Asn Ile Ile Lys Glu Lys Asp Lys Lys Cys Thr Thr Leu Lys Ala	
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Asn Val Ala Thr Ala Leu Gly Ser Phe Lys Lys Glu Ile Cys Leu Glu	
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Pro Asn Asp Lys Ile Val Glu Trp Arg Lys Leu Pro Thr Phe Leu Thr	
385 390 395 400	

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Ala Cys Pro Asn Ala Lys Glu Glu Cys Met Asn Leu Arg Ala Ala Cys	
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Trp His Thr Tyr Cys Asn Arg Phe Ser Pro Asn Cys Pro Gly Leu Thr	
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Lys Glu Asn Ser Cys Thr Lys Ile Lys Lys His Cys Glu Pro Phe Tyr	
675 680 685	
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Lys Arg Lys Lys Ala Leu Glu Asp Ala Leu Lys Val Glu Leu Gln Gly Lys	
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Asn Thr Lys Asp Asn Ser Gly Lys Ser Asp Glu Asp Ala Arg Lys Glu	
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755 760 765	
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Thr Tyr Glu Glu Leu Lys Lys Arg Ala Glu Glu Ala Met Asn Lys Ser	
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Ser Val Thr Glu Leu Glu Ala Lys Ala Phe Asp Leu Ala Ala Glu Val	
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Phe Gly Arg Tyr Val Asp Leu Lys Glu Arg Cys Asn Lys Leu Glu Ser	
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Asp Cys Arg Ile Lys Glu Asp Cys Lys Asp Leu Glu Glu Val Cys Lys	
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Lys Ile Asn Lys Ala Cys Arg Asn Leu Lys Pro Leu Glu Val Lys Pro	
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His Glu Thr Val Thr Glu Ser Thr Thr Thr Thr Thr Thr Thr Thr	
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Thr Val Ala Asp Pro Lys Ala Thr Glu Cys Lys Ser Leu Gln Thr Thr	
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Asp Thr Trp Val Thr Gln Thr Ser Thr His Thr Ser Thr Ser Thr Ile	
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Lys Pro Thr Lys Cys Thr Thr Gly Asp Asp Ala Glu Asp Val Lys Pro	
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 Glu Thr His Glu Lys Lys Leu Lys Glu Ile Cys Pro Val Leu Gln Arg  
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 Asn Val Ala Thr Ala Leu Gly Ser Phe Lys Lys Glu Ile Cys Leu Glu  
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 690 695 700  
 Leu Thr Asp Lys Ser Lys Cys Glu Pro Ala Leu Lys Arg Tyr Cys Thr  
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 Thr Tyr Glu Glu Leu Lys Lys Arg Ala Glu Glu Ala Met Asn Lys Ser  
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 Asp Thr Thr Lys His Val Lys Ile Leu Arg Arg Gly Val Lys Asp Val  
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 His Glu Thr Val Thr Glu Ser Thr Thr Thr Thr Thr Thr Thr Thr  
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Cys Glu Asp Gly Lys Ala Asp Thr Lys Cys Lys Glu Leu Lys Ala Asn	
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Lys Lys Lys Ile Gln Ile Ile Thr Asp Lys Asp Cys Lys Glu Asn Glu	
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Gln Gln Cys Leu Phe Leu Glu Gly Val Cys Ser Lys Glu Leu Lys Asp	
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Asp Cys Asn Thr Leu Arg Asn Lys Cys Tyr Gln Lys Lys Arg Asp Lys	
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Arg Glu Ser Asp Glu Leu Thr Asn Leu Cys Leu Asn Gln Lys Glu Thr	
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Cys Lys Asn Ile Leu Ile Glu Lys Asp Lys Lys Cys Gly Thr Leu Lys	
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Ile Ala Tyr Met Pro Pro Gly Pro Asp Phe Asp Pro Thr Arg Pro Glu	
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Ala Thr Cys Tyr Lys Arg Gly Leu Asp Ala Arg Ala Asn Lys Val Leu	
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Gln Glu Asn Met Arg Gly Met Leu His Gly Ser Asn Lys Ser Trp Leu	
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Gln Gln Cys Leu Phe Leu Glu Gly Val Cys Ser Lys Glu Leu Lys Asp  
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Asp Cys Asn Thr Leu Arg Asn Lys Cys Tyr Gln Lys Lys Arg Asp Lys  
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Ser Val Ile Cys Glu Lys Lys Leu Lys Glu Ile Cys Pro Val Met Gly  
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 Ile Ala Tyr Met Pro Pro Gly Pro Asp Phe Asp Pro Thr Arg Pro Glu  
 260 265 270  
 Ala Thr Ile Ala Glu Asp Ile Gly Leu Glu Glu Phe Tyr Lys Lys Val  
 275 280 285  
 Glu Glu Asp Gly Val Phe Ile Gly Lys Asn His Leu Arg Asp Ala Thr  
 290 295 300  
 Ala Leu Leu Ala Leu Leu Ile Gln Asp Ser Ser Leu Lys Lys Lys Asp  
 305 310 315 320  
 Asp Lys Glu Lys Cys Glu Glu Ala Leu Gln Lys Ser Cys Lys Asn Pro  
 325 330 335  
 His Glu His Glu Ala Leu Glu Ser Leu Cys Lys Lys Asn Gly Leu Ser  
 340 345 350  
 Asn Asp Gly Thr Lys Lys Cys Glu Glu Leu Gln Asn Asp Ile Asn Lys  
 355 360 365  
 Thr Cys Lys Ile Phe Thr Ser Lys Val Thr Asn Asn Arg Leu Phe Asp  
 370 375 380  
 Pro Thr Lys Gly Asn Asn Glu Ile Val Gly Trp Glu Gly Leu Pro Thr  
 385 390 395 400  
 Phe Leu Ser Asn Glu Asp Cys Ala Lys Leu Glu Ser Tyr Cys Phe Tyr  
 405 410 415  
 Phe Glu Lys Lys Cys Pro Asp Gly Glu Asn Ala Cys Lys Asn Ile Arg  
 420 425 430  
 Ala Thr Cys Tyr Lys Arg Gly Leu Asp Ala Arg Ala Asn Lys Val Leu  
 435 440 445  
 Gln Glu Asn Met Arg Gly Met Leu His Gly Ser Asn Lys Ser Trp Leu  
 450 455 460  
 Glu Lys Phe Gln Gln Glu Leu Val Lys Val Cys Glu Lys Leu Lys Lys  
 465 470 475 480  
 Glu Asn Lys Gly Ser Phe Ser Asn Asp Glu Leu Phe Ile Leu Cys Val  
 485 490 495

Gln Pro Ala Lys Ala Ala Arg Leu Leu Thr His Asp Leu Arg Met Lys  
                   500                                  505                                  510  
 Thr Ile Phe Leu Arg Gln Gln Leu Asp Gln Lys Arg Asp Phe Pro Thr  
                   515                                  520                                  525  
 Asp Lys Asn Cys Lys Glu Leu Gly Arg Lys Cys Gln Asp Leu Gly Glu  
                   530                                  535                                  540  
 Asp Ser Lys Glu Ile Thr Trp Pro Cys His Thr Leu Glu Gln Gln Cys  
                   545                                  550                                  555                                  560  
 Asn Arg Leu Gly Thr Thr Glu Ile Leu Lys Gln Val Leu Leu Asp Glu  
                                   565                                  570                                  575  
 His Lys Asp Thr Leu Lys Asp Gln Glu Ser Cys Val Lys Tyr Leu Lys  
                                   580                                  585                                  590  
 Glu Lys Cys Asn Lys Trp Ser Arg Arg Gly Asp Asp Arg Phe Ser Phe  
                   595                                  600                                  605  
 Val Cys Val Phe Gln Asn Ala Thr Cys Glu Leu Met Val Lys Asp Val  
                   610                                  615                                  620  
 Lys Asp Arg Cys Glu Val Phe Lys Lys Asn Ile Lys Ala Ser Tyr Ile  
                   625                                  630                                  635                                  640  
 Ile Glu Phe Leu Glu Asn Asn Thr Asn Lys Ile Thr Thr Leu Glu Arg  
                                   645                                  650                                  655  
 Asn Cys Pro Ser Trp His Thr Tyr Cys Asn Arg Phe Ser Pro Asn Cys  
                   660                                  665                                  670  
 Pro Gly Leu Thr Lys Glu Asn Ser Cys Thr Lys Ile Lys Lys His Arg  
                   675                                  680                                  685  
 Glu Pro Phe Tyr Lys Arg Lys Ala Leu Glu Asp Ala Leu Lys Val Glu  
                   690                                  695                                  700  
 Leu Gln Gly Lys Leu Thr Asp Lys Ser Lys Cys Glu Pro Ala Leu Lys  
                   705                                  710                                  715                                  720  
 Arg Tyr Cys Thr Val Ala Gly Asn Val Asn Asn Ala Ser Ile Ser Gly  
                                   725                                  730                                  735  
 Leu Cys Lys Ala Asn Thr Lys Asp Asn Ser Gly Lys Ser Asp Glu Asp  
                   740                                  745                                  750  
 Ala Arg Lys Glu Leu Cys Glu Lys Leu Val Lys Glu Val Glu Glu Gln  
                   755                                  760                                  765  
 Cys Lys Ala Leu Pro Thr Glu Leu Gly Gln Pro Ala Ala Asp Leu Lys  
                   770                                  775                                  780  
 Lys Asp Tyr Lys Thr Tyr Glu Glu Leu Lys Lys Arg Ala Glu Glu Ala  
                   785                                  790                                  795                                  800  
 Met Asn Lys Ser Ser Leu Val Leu Ser Leu Ile Lys Lys Asn Glu Ser  
                                   805                                  810                                  815

Asn Val Ser Lys Ser Asn Ser Lys Asn Lys Asp Lys Asn Ala Val Ser  
 820 825 830  
 Asn Gly Leu Gln Asp Thr Thr Lys His Val Lys Ile Leu Arg Arg Gly  
 835 840 845  
 Val Lys Asp Val Ser Val Thr Glu Leu Glu Ala Lys Ala Phe Asp Leu  
 850 855 860  
 Ala Ala Glu Val Phe Gly Arg Tyr Val Asp Leu Lys Glu Arg Cys Asn  
 865 870 875 880  
 Lys Leu Glu Ser Asp Cys Arg Ile Lys Glu Asp Cys Lys Asp Leu Glu  
 885 890 895  
 Glu Val Cys Lys Lys Ile Asn Lys Ala Cys Arg Asn Leu Lys Pro Leu  
 900 905 910  
 Glu Val Lys Pro His Glu Thr Val Thr Glu Ser Thr Thr Thr Thr Thr  
 915 920 925  
 Thr Thr Thr Thr Thr Val Ala Asp Pro Lys Ala Thr Glu Cys Lys Ser  
 930 935 940  
 Leu Gln Thr Thr Asp Thr Trp Val Thr Gln Thr Ser Thr His Thr Ser  
 945 950 955 960  
 Thr Ser Thr Ile Thr Ser Thr Ile Thr Ser Lys Ile Thr Leu Thr Ser  
 965 970 975  
 Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr Thr Gly Glu Glu Asp Asp  
 980 985 990  
 Ala Gly Asp Val Lys Pro Ser Glu Gly Leu Arg Met Ser Gly Trp Asn  
 995 1000 1005  
 Val Met Arg Gly Val Ile Val Ala Met Val Ile Ser Phe Met Ile  
 1010 1015 1020

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 <211> 249  
 <212> DNA  
 <213> *Pneumocystis carinii* sp. f. *hominis*

<220>  
 <221> CDS  
 <222> (1)..(249)

<400> 15  
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 Glu Cys Gln Ser Leu Gln Thr Thr Asp Thr Trp Val Thr Lys Thr Ser  
 1 5 10 15  
 acc cat act agc act tct acg act acg tcc aca gtc aca tcg aga ata 96  
 Thr His Thr Ser Thr Ser Thr Thr Thr Ser Thr Val Thr Ser Arg Ile  
 20 25 30  
 aca ctc acc tca acg agg cgg tgt aag cct acg aag tgt acg aca gga 144  
 Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr Thr Gly  
 35 40 45

gag gaa gat gat gca gga gag gtg aag ccg agt gaa ggg ctg agg atg 192  
 Glu Glu Asp Asp Ala Gly Glu Val Lys Pro Ser Glu Gly Leu Arg Met  
           50                          55                          60

agt ggg tgg agt gtg atg agg ggg gtg tta tta gca atg atg att tca 240  
 Ser Gly Trp Ser Val Met Arg Gly Val Leu Leu Ala Met Met Ile Ser  
           65                          70                          75                          80

ttc atg att 249  
 Phe Met Ile

<210> 16  
 <211> 83  
 <212> PRT  
 <213> *Pneumocystis carinii* sp. f. *hominis*

<400> 16  
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 Thr His Thr Ser Thr Ser Thr Thr Thr Ser Thr Val Thr Ser Arg Ile  
                           20                          25                          30  
 Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr Thr Gly  
                           35                          40                          45  
 Glu Glu Asp Asp Ala Gly Glu Val Lys Pro Ser Glu Gly Leu Arg Met  
           50                          55                          60  
 Ser Gly Trp Ser Val Met Arg Gly Val Leu Leu Ala Met Met Ile Ser  
           65                          70                          75                          80  
 Phe Met Ile

<210> 17  
 <211> 25  
 <212> DNA  
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<220>  
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           oligonucleotide

<400> 17  
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<210> 18  
 <211> 25  
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 <213> Artificial Sequence

<220>  
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           oligonucleotide



<400> 18  
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<210> 19  
 <211> 26  
 <212> DNA  
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<220>  
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 oligonucleotide

<400> 19  
 tgcaaaccac ccaagtgtac gacagg 26

<210> 20  
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<220>  
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<400> 20  
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<210> 21  
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 <213> Artificial Sequence

<220>  
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<400> 21  
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<210> 22  
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 <212> DNA  
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<220>  
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<400> 22  
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<210> 23  
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<220>  
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 peptide

<400> 25  
 Lys Met Tyr Gly Leu Phe Tyr Gly Ser Gly Lys Glu Trp Phe Lys Lys  
 1 5 10 15  
 Leu Leu Glu Lys Ile Met  
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<210> 26  
 <211> 15  
 <212> PRT  
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<400> 26  
 Thr Ile Thr Ser Thr Ile Thr Ser Lys Ile Thr Leu Thr Ser Thr  
 1 5 10 15  
 1  
 13